

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,050,169 B2
APPLICATION NO. : 10/645331
DATED : May 23, 2006
INVENTOR(S) : Aydogan Ozcan et al.

Page 1 of 6

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

On Page 2, Col. 1 ("U.S. Patent Documents"), line 15, after 6,650,486, delete "**B1**" and insert -- **B2** --.

On Page 2, Col. 1 ("U.S. Patent Documents"), line 16, after 6,856,393, delete "**B1**" and insert -- **B2** --.

On Page 2, Col. 1 ("Other Publications"), line 9, delete "**technique**" and insert -- **technique** --.

On Page 2, Col. 1 ("Other Publications"), line 18, after "**Ozcan**", delete "**A.**" and insert -- **A.**, --.

On Page 2, Col. 2 ("Other Publications"), line 7, delete "**Search.**" and insert -- **Search.** --.

On Page 2, Col. 2 ("Other Publications"), line 8, delete "**Marker**" and insert -- **Maker** --.

On Page 2, Col. 2 ("Other Publications"), line 14, delete "**(1988),**" and insert -- **(1998),** --.

On Page 2, Col. 2 ("Other Publications"), line 29, after "**SPIE**", insert -- , --.
[comma]

On Page 2, Col. 2 ("Other Publications"), line 48, delete "**Fringes**" and insert -- **fringes** --.

On Sheet 2 of 39, Box 140 (Fig. 2), Line 1, delete "**NONLINEARITY**" and insert -- **NONLINEARITY** --.

In Col. 2, line 30, delete " $f(\theta n_1, n_2)$ " and insert -- $f(\theta, n_1, n_2)$ --.

In Col. 4, line 51, delete "**obtaines**" and insert -- **obtains** --.

In Col. 8, line 64, delete "**n.**" and insert -- **n.** --.

In Col. 9, line 1, delete "**n.**" and insert -- **n.** --.

In Col. 9, line 43, delete "**20 180°**" and insert -- **20 at 180°** --.

In Col. 15, line 45, delete "**LG**" and insert -- **L_G** --.

In Col. 15, lines 57-58 (approx.), delete Equation 8 as set out in the patent grant, and insert

$$-- MF_{S1} = |D^{S1}(f)|^2 = |D_A(f) - D_B(-f)|^2 = \|D_A(f)e^{j\phi_A(f)} - D_B(f)e^{-j\phi_B(f)}\|^2 --.$$

In Col. 15, line 60 (approx.), delete Equation 9 as set out in the patent grant, and insert

$$-- MF_{S2} = |D^{S2}(f)|^2 = |D_A(f) + D_B(f) \cdot e^{-j2\pi L}|^2 = \|D_A(f) \cdot e^{j\phi_A(f)} + D_B(f) \cdot e^{j\phi_B(f) - \phi_0(f)}\|^2 --.$$

In Col. 15, line 64 (approx.), delete "**MF_{S1} and MF_{S2}**" and insert -- **MF_{S1} and MF_{S2}** --.

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In Col. 15, line 65, delete Equation 10 as set out in the patent grant, and insert

$$-- MF_{s1} = |D_A|^2 + |D_B|^2 - 2|D_A||D_B|\cos(\phi_A + \phi_B) --.$$

In Col. 15, line 67 (approx.), delete Equation 11 as set out in the patent grant, and insert --

$$MF_{s2} = |D_A|^2 + |D_B|^2 + 2|D_A||D_B|\cos(\phi_A - \phi_B + \phi_0) --.$$

In Col. 16, line 24 (approx.), delete Equation 14 as set out in the patent grant, and insert --

$$\phi_A + \phi_B = 2\pi \cdot m \pm \left| \cos^{-1} \left(\frac{\alpha}{\Delta} \right) \right| --.$$

In Col. 19, line 9 (approx.), after “magnitude”, insert -- of --.
In Col. 19, line 24 (approx.), after “magnitude of”, delete “(i.e., the Fourier transform magnitude of”.
In Col. 20, line 1, delete “y” and insert -- yield --.

In Col. 20, line 18 (approx.), delete “ $2|D_A|P_1$ and $2|D_A|P_2$ ” and insert -- $2|D_A|P_1$ and $2|D_A|P_2$ --.

In Col. 20, line 24 (approx.), delete the equation following the word “measured” and before the word “data”, and insert $MF(f) = |D_A(f)|^2$ -- --.

In Col. 21, line 31, delete the equation following the words “Equation 2”, and insert --

$$MF_{s1} = 4|D_A|^2 \sin^2(\phi_A) --.$$

In Col. 21, line 44, delete the symbols following “i.e.”, and insert --

$$MF_{s1} = 4|D_A|^2 \sin^2(\phi_A) --.$$

In Col. 21, line 45, delete the symbols following the word “of” and before the period, and insert

$$-- d(z) - d(-z) \text{ is } 2j|D_A|\sin(\phi_A) --.$$

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In Col. 21, line 53, delete “dz” and insert -- d(z) --.

In Col. 21, line 58, delete “nonlinearitly” and insert -- nonlinearity --.

In Col. 23, line 30 (approx.), delete “dS2(z),” and insert -- d_{S2}(z), --.

In Col. 23, line 32 (approx.), delete Equation 28 as set out in the patent grant, and insert

$$-- MF_{S1} = |D_A|^2 + |D_B|^2 - 2|D_A||D_B|\cos(\phi_A + \phi_B + \phi_1) --.$$

In Col. 23, line 34 (approx.), delete Equation 29 as set out in the patent grant, and insert

$$-- MF_{S2} = |D_A|^2 + |D_B|^2 + 2|D_A||D_B|\cos(\phi_A - \phi_B + \phi_2) --.$$

In Col. 23, line 37 (approx.), delete the equation following the word **and**, and insert -- $\phi_2(f) = 2\pi fL$ --.

In Col. 23, line 43 (approx.), delete “MFS₂” and insert -- MF_{S2} --.

In Col. 24, line 8, after MF_B, insert -- , --. [comma]

In Col. 24, line 10, delete “z<0” and insert -- z ≤ 0 --.

In Col. 26, line 10, delete “220,a” and insert -- 220, a --.

In Col. 26, line 12, delete “230,an” and insert -- 230, an --.

In Col. 27, line 41, delete “ $\int_{pump,1}$ ” and insert -- $\omega_{pump,1}$ --.

In Col. 29, line 22, delete Equation 41 as set out in the patent grant, and insert

$$-- u_{out}(t) \approx u_r(t) * u_r(-t) * u_s(t) e^{j\vec{K}_1 \vec{r}} + u_r(t) * u_r(t) * u_s(-t) e^{j\vec{K}_2 \vec{r}} --.$$

In Col. 29, line 64, delete “produ_ct” and insert -- product --.

In Col. 30, line 27 (approx.), delete Equation 45 as set out in the patent grant, and insert -- $E_{2\omega}(t) = u_{2\omega}(t) e^{j2\omega t} = \eta_{u1}(t) u_2(t) e^{j2\omega t} = \eta_{u1}(t) u_1(t - \tau) e^{j\omega \tau} e^{j2\omega t}$ --.

In Col. 30, line 30, delete the symbol following the word “where” and before the word “is” as set out in the patent grant, and insert -- η --.

In Col. 30, line 30, after “to”, delete “,”. [comma]

In Col. 30, line 51 (approx.), delete Equation 47 as set out in the patent grant,

and insert -- $\bar{A}_{PMT_single}(f) = |\eta|^2 |\bar{I}(f)|^2$ --.

In Col. 31, line 34, delete “At” and insert -- Δt --.

In Col. 31, line 60 (approx.), delete Equation 50 as set out in the patent grant,

and insert -- $\bar{A}_{PMT_double}(f) = 2|\eta|^2 |\bar{I}(f)|^2 [1 + \cos(2\phi(f) - f\Delta t)]$ --.

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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In Col. 32, line 13, delete the symbols following the word “**signal**” and before the word “**recorded**”, and insert -- $A_{PMT_single}(\tau)$ --.

In Col. 32, line 33, delete the symbols following the words “**magnitude of**” and before the words “**(expressed by)**”, and insert $\tilde{A}_{PMT_double}(f)$ -- --.

In Col. 32, line 35, delete the symbols following the word “**measured**” and before the period, and insert -- $A_{PMT_double}(\tau)$ --.

In Col. 32, line 36, delete the symbols following the word “**measured**” and before the words “**is a**”, and insert -- $A_{PMT_double}(\tau)$ --.

In Col. 32, line 38, delete the symbols following the word “**signal**” and before the word “**measured**”, and insert -- $A_{PMT_single}(\tau)$ --.

In Col. 32, line 41 (approx.), delete the symbols following the word “**measured**” and before the words “**(i.e., from. . .)**”, and insert -- $A_{PMT_double}(\tau)$ --.

In Col. 33, line 43 (approx.), delete the symbols following the word “**transform**” and before the words “**is equivalent**”, and insert -- $\tilde{I}_{symmetric}(f)$ --.

In Col. 33, line 48 (approx.), after “**(i.e.,**”, delete “**(i.e.,**”.

In Col. 34, line 13 (approx.), delete “**su_ch**” and insert -- **such** --.

In Col. 34, line 23 (approx.), delete Equation 52 as set out in the patent grant, and insert -- $u_s(t) = \tilde{u}_s(t)e^{j\omega_c t}$ --.

In Col. 34, line 25 (approx.), delete the symbols following the word “**where**” and before the words “**is the**”, and insert -- $\tilde{u}_s(t)$ --.

In Col. 34, line 28 (approx.), delete Equation 53 as set out in the patent grant, and insert -- $u_s(t) = \int \tilde{U}_s(\omega - \omega_c)e^{j\omega t}d\omega$ --.

In Col. 34, line 31 (approx.), delete the symbols following the word “**where**” and before the word “**denotes**”, and insert -- $\tilde{U}_s(\omega)$ --.

In Col. 34, line 31 (approx.), delete the symbols following the words “**transform of**” and before the period, and insert -- $\tilde{u}_s(t)$ --.

In Col. 34, line 33 (approx.), delete the symbols following the words “**with amplitudes**”, and insert -- $\tilde{U}_s(\omega - \omega_c)$ --.

In Col. 34, line 36, delete the symbols following “**(i.e.,**”, and insert -- $\tilde{U}_s(\omega - \omega_c)e^{j\omega t}$ --.

In Col. 34, line 40, delete the symbols following the word “**harmonic**” and before the words “**at the plane**”, and insert -- $\tilde{U}_s(\omega - \omega_c)e^{j\omega t}$ --.

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In Col. 35, line 26 (approx.), delete Equation 57 as set out in the patent grant, and insert -- $u_{2s}(x';t) = \int \tilde{U}_{2s}(x';\omega,t)d\omega$ --.

In Col. 35, line 47 (approx.), delete Equation 59 as set out in the patent grant, and insert -- $u_{total}(t) = (\tilde{u}_s(t) + \tilde{u}_s^*(-t - \Delta t))e^{j\omega_c t}$ --.

In Col. 36, line 1, delete the equation following the word “**Defining**” and before the word “**and**”, and insert -- $\tilde{U}_s(\omega) = |\tilde{U}_s(\omega)|e^{j\phi(\omega)}$ --.

In Col. 36, line 41, delete the symbols following the word “**function**” and before the comma, and insert -- $\tilde{u}_s(t)$ --.

In Col. 36, line 47 (approx.), delete the symbols following the word “**function**” and before the words “**to be characterized**”, and insert -- $\tilde{u}_s(t)$ --.

In Col. 37, line 9, delete the symbols following the word “**function**” and before the comma, and insert -- $\tilde{u}_s(t)$ --.

In Col. 37, line 11, delete the symbols following the word “**function**” and before the words “**can be**”, and insert -- $\tilde{u}_s(t)$ --.

In Col. 37, line 27 (approx.), delete the symbols following the word “**function**” and before the words “**of any**”, and insert -- $\tilde{u}_s(t)$ --.

In Col. 38, line 36, delete “**su_ch**” and insert -- **such** --.

In Col. 39, line 18 (approx.), delete Equation 66 as set out in the patent grant, and insert -- $I_{C2}(t) = I_A(t) + I_B(-t + \tau_2)$ --.

In Col. 39, line 20, delete “**r2**” and insert -- τ_2 --.

In Col. 39, line 53 (approx.), delete the symbols following the word “**and**” and before the words “**a time**”, and insert -- τ is --.

In Col. 39, line 58 (approx.), delete Equation 68 as set out in the patent grant, and insert -- $|I_C(f)|^2 = |I(f)|^2 + |I_{Ref}(f)|^2 + 2|I_{Ref}(f)|I(f)\cos(\phi - \phi_{Ref} + \phi_0)$ --.

In Col. 39, line 60, delete the equation following the word “**where**” and before the words “**is the Fourier**”, and insert -- $I(f) = |I(f)|e^{j\phi}$ --.

In Col. 39, line 63, delete the symbols following the word “**with**” and before the period, and insert -- $\phi_0 = 2\pi f\tau$ --.

In Col. 40, line 7, delete the symbols following the words “**transforms of**” and before the word “**and**”, and insert -- $[|I(f)|^2 + |I_{Ref}(f)|^2]$ --.

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In Col. 40, line 11, delete the symbols following the word "**both**" and before the word "**and**", and insert -- $[I(\omega)^2 + |I_{Ref}(\omega)|^2]$ --.

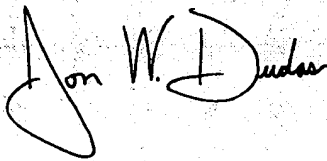
In Col. 40, line 20, delete the symbols following the word "**quantities**" and before the word "**and**", and insert -- $[I(\omega)^2 + |I_{Ref}(\omega)|^2]$ --.

In Col. 40, line 31, delete "**q**" and insert -- ϕ --.

In Col. 42, line 30, delete "**first-reference**" and insert -- **first reference** --.

Signed and Sealed this

Fourteenth Day of November, 2006

A handwritten signature in black ink, appearing to read "Jon W. Dudas", is written over a faint, rectangular grid background.

JON W. DUDAS

Director of the United States Patent and Trademark Office